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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/742,006	12/18/2003	Steven T. Mayer	NOVLP065/NVLS-000796	5177

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EXAMINER	
BAREFORD, KATHERINE A	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/742,006	MAYER ET AL.	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) *30-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 29, 2006 has been entered.

The amendment filed with the RCE submission of June 29, 2006 has been received and entered. With the amendment, claims 1-29 are pending for examination and claims 30-33 remain withdrawn from consideration.

Claim Objections

2. Claim 5 is objected to because of the following informalities: in claim 5, line 2, "hypophophite" should be correctly spelled "hypophosphite" as at page 12, last two lines of the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Feldstein (US 4181760).

Claim 1: Feldstein teaches a method of selectively depositing a cobalt containing capping layer on exposed metal portions of a substrate that can contain both exposed metal and dielectric. Column 2, lines 40-65 and column 3, lines 1-20. A cobalt nucleation layer is formed on the exposed metal portion of the substrate by electroless deposition from a first solution comprising cobalt ions. Column 2, lines 50-65 and column 3, lines 30-60 and column 4, lines 5-20 (the "developing/promoting" layer is the "nucleation layer", the coating process is by electroless deposition given the described use of the metal ions and reducing agent). A bulk cobalt layer can be formed on the cobalt nucleation layer by electroless deposition from a second solution comprising cobalt ions and a reducing agent that promotes electroless deposition on elemental cobalt surfaces. Column 2, lines 50-65 and column 4, lines 5-20. The first and second solutions have

different compositions. Column 4, lines 20-35 and 50-68 and column 6, lines 25-50 (the first solution would use the borane reducing agent and the second solution would use hypophosphite, for example).

Claim 2: the first solution can comprise a water soluble borane compound, such as dimethylamine borane. Column 4, lines 50-68 and column 7, lines 1-10.

Claim 5: the reducing agent for the second solution can comprise hypophosphite ion. Column 5, lines 50-60.

Claim 6: the metal (exposed metal) can be copper. Column 3, lines 1-20.

Claim 8-9: the first solution can comprise a complexing agent that can be citrate. Column 3,lines 45-50 and column 7, lines 1-10.

Claim 12: the first solution can have a temperature of 36 degrees C. Column 7, lines 1-10.

Claim 13: the contacting with the first solution can be by dipping. Column 6, lines 1-20.

Claim 14: the bulk cobalt layer can comprise phosphorous. Column 5, lines 50-60 (from the use of hypophosphite).

Claim 19: the contacting with the second solution can be by dipping. Column 6, lines 1-20.

Claim 27: the cobalt nucleation layer can be deposited selectively on the exposed metal portions of the substrate. Column 3, lines 15-20.

Claim 28: the substrate can be an integrated circuit. Column 1, lines 5-10. The first solution can comprise metal ions and water soluble borane compound. Column 7, lines 1-10, for example. The bulk metal layer can be deposited from a solution containing metal ions and a reducing agent that promotes electroless deposition. Column 5, lines 50-60. The first and second solutions have different compositions. Column 6, lines 30-50.

Claim 29: the metal containing capping layer can be nickel or cobalt. Column 5, lines 50-60.

5. Claims 1-2, 6, 8-14, 18-20, 24 and 27 are rejected under 35 U.S.C. 102(a) or (e) as being anticipated by Inoue (US2003/0075808).

Claim 1: Inoue teaches a method of selectively depositing a cobalt containing capping layer on exposed metal portions of a substrate that can contain both exposed metal and dielectric. Paragraphs [0116] – [0117] and [0247]. A cobalt nucleation (seed) layer is formed on the exposed metal portion of the substrate by electroless deposition from a first solution comprising cobalt ions. Paragraphs [0247] – [0258] (the Co-B alloy deposition). A bulk cobalt layer can be formed on the cobalt nucleation layer by electroless deposition from a second solution comprising cobalt ions and a reducing agent that promotes electroless deposition on elemental cobalt surfaces. Paragraphs [0247] – [0258] The first and second solutions have different compositions. Paragraph [0258] (the seed layer solution not containing W).

Claim 2: the first solution can comprise a water soluble borane compound, such as dimethylamine borane. Paragraphs [0247] – [0258].

Claim 6: the metal (exposed metal) can be copper. Paragraph [0247].

Claim 8-9: the first solution can comprise a complexing agent that can be glycine. Paragraphs [0247] – [0258].

Claim 10: the pH of the first solution can be 9. Paragraphs [0250] and [0259].

Claim 11: a pH adjuster to make the solution more alkaline can be present. Paragraph [0250] (note the materials used).

Claim 12: the first solution can have a temperature of 30-90 degrees C. Paragraph [0250].

Claim 13: the contacting with the first solution can be by dipping or spraying. Paragraph [0258], [0259] and figure 22.

Claim 14: the bulk cobalt layer can comprise phosphorous. Paragraph [0256] (from the use of tangstophosphoric acids).

Claim 18: the pH of the second layer can be 9. Paragraph [0260].

Claim 19: the contacting with the second solution can be by dipping or spraying. Paragraph [0258] and [0260] and figure 22.

Claim 20: metal portions of the substrate can be annealed prior to forming the cobalt nucleation layer. Paragraph [0247].

Claim 24: post plating cleaning can be carried out after forming the bulk cobalt layer. Paragraph [0247] and [0260].

Claim 27: the cobalt nucleation layer can be deposited selectively on the exposed metal portions of the substrate. Paragraph.[0247].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 3-4, 7 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein (US 4181760).

Feldstein teaches all the features of these claims except (1) the precise borane compound used (claim 3), (2) the aqueous solution (claim 4), (3) the precise amount of

boron in the nucleation layer (claim 7), (4) the pH of the first solution (claim 10) and (5) the adjustment of the pH to render the first solution more alkaline (claim 11).

However, Feldstein does teach that the borane compound can be dimethylamine borane (DMAB). Column 7, lines 1-10 and column 4, lines 60-68. Feldstein also teaches that the borane can be present in the first solution in a concentration of 3 grams/liter. Column 7, lines 1-10. Feldstein also teaches that boron would be present in the nucleation layer from the presence of borane in the solution. Column 7, lines 1-10. Feldstein also teaches that the pH of the first solution can vary, and teaches a first solution with a pH of 9.9. Column 8, lines 35-45. Feldstein also teaches that pH adjusters can be added to the first solution. Column 3, lines 45-55.

It is the Examiner's position that it is well known in the art of electroless coating to use aqueous coating solutions. If applicant disagrees he should so respond on the record.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to use N,N-dimethylamine borane with an expectation of desirable coating results because Feldstein teaches to use dimethylamine borane in general, which would be inclusive of all types of dimethylamine borane. It would further have been obvious to modify Feldstein to provide that the first solution is aqueous with an expectation of desirable coating results, because Feldstein teaches to use an electroless plating solution and it is well known in the art that such solutions are conventionally aqueous. It would further have been obvious to modify Feldstein to

optimize the amount of boron compound in the plating bath as taught by column 5, lines 25-50 and thus, correspondingly optimize the amount of boron present in the coated layer. It would further have been obvious to modify Feldstein to provide pH adjusters to make the first solution more or less alkaline as desired and to optimize the exact pH to be used because Feldstein teaches to use pH adjusters and that a variety of pHs can be used.

9. Claims 3-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al (US2003/0075808).

Inoue teaches all the features of these claims except (1) the precise borane compound used (claim 3), (2) the aqueous solution (claim 4), (3) the precise amount of boron in the nucleation layer (claim 7).

However, Inoue does teach that the borane compound can be dimethylamine borane (DMAB). Paragraph [0255]. Inoue also teaches that the borane can be present in the first solution in a concentration of 0.01-1 mol/liter. Paragraph [0255]. Inoue teaches that B (boron) can be in the seed layer. Paragraph [0258].

It is the Examiner's position that it is well known in the art of electroless coating to use aqueous coating solutions. If applicant disagrees he should so respond on the record.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to use N,N-dimethylamine borane with an

expectation of desirable coating results because Inoue teaches to use dimethylamine borane in general, which would be inclusive of all types of dimethylamine borane. It would further have been obvious to modify Inoue to provide that the first solution is aqueous with an expectation of desirable coating results, because Inoue teaches to use an electroless plating solution and it is well known in the art that such solutions are conventionally aqueous. It would further have been obvious to modify Inoue to optimize the amount of boron compound in the plating bath as taught at paragraph [0255] and thus, correspondingly optimize the amount of boron present in the coated layer.

10. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein as applied to claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 above, and further in view of Chebiam et al (US 6645567).

Feldstein teaches all the features of these claims except the incorporation of boron into the bulk layer or the amount of phosphorous and boron in the bulk layer.

However, Chebiam teaches that desirable cobalt alloy layers applied by electroless plating can comprise both boron and phosphorous (CoBP). Column 6,lines 10-25. The boron can be present from 0.1 to 20 % and the phosphorous can be 0-5 %, from the reducing agents used. Column 10, lines 45-55.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to use boron and phosphorous in the bulk

coating layer as suggested by Chebium with an expectation of desirable coating results because Feldstein teaches to apply conventional electroless layers including cobalt with phosphorous reducing agent and Chebium teaches that CoBP films are desirable for semiconductor devices. It further would have been obvious to modify Feldstein in view of Chebium to optimize the amount of boron and phosphorous to be present from the range given by Chebium. See In re Malagari, 182 USPQ 549.

11. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 1-2, 6, 8-14, 18-20, 24 and 27 above, and further in view of Chebiam et al (US 6645567).

Inoue teaches all the features of these claims except the incorporation of boron and phosphorous into the bulk layer or the amount of phosphorous and boron in the bulk layer.

However, Chebiam teaches that desirable cobalt alloy layers applied by electroless plating can comprise both boron and phosphorous (CoBP). Column 6,lines 10-25. The boron can be present from 0.1 to 20 % and the phosphorous can be 0-5 %, from the reducing agents used. Column 10, lines 45-55.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to use boron and phosphorous in the bulk coating layer as suggested by Chebium with an expectation of desirable coating results because Inoue teaches to apply conventional electroless layers including cobalt with boron and

phosphorous material and Chebium teaches that CoBP films are desirable for semiconductor devices. It further would have been obvious to modify Inoue in view of Chebium to optimize the amount of boron and phosphorous to be present from the range given by Chebium. See In re Malagari, 182 USPQ 549.

12. Claims 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein as applied to claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 above, and further in view of Hu et al (US 6342733).

Feldstein teaches all the features of these claims except the etching back of metal before forming the nucleation layer and the post plating annealing of the bulk cobalt layer.

However, Hu teaches electroless coating cobalt on a nucleation layer. Column 2, lines 5-20. Hu teaches that the substrate including exposed portions of copperlines (29) may be planarized (i.e. etched back) prior to forming a nucleation layer. Column 3,lines 62-64. There can be post plating annealing after forming the bulk cobalt layer. Column 3, lines 5-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to perform etching prior to plating and post plating annealing as suggested by Hu with an expectation of desirable coating results because Feldstein teaches to apply conventional electroless layers to various substrates

and Hu teaches that when applying electrolessly plated cobalt to substrates it can be desirable to perform etching prior to plating and post plating annealing.

13. Claims 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 1-2, 6, 8-14, 18-20, 24 and 27 above, and further in view of Hu et al (US 6342733).

Inoue teaches all the features of these claims except the etching back of metal before forming the nucleation layer and the post plating annealing of the bulk cobalt layer.

However, Hu teaches electroless coating cobalt on a nucleation layer. Column 2, lines 5-20. Hu teaches that the substrate including exposed portions of copperlines (29) may be planarized (i.e. etched back) prior to forming a nucleation layer. Column 3,lines 62-64. There can be post plating annealing after forming the bulk cobalt layer. Column 3, lines 5-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to perform etching prior to plating and post plating annealing as suggested by Hu with an expectation of desirable coating results because Inoue teaches to apply conventional electroless layers to various substrates and Hu teaches that when applying electrolessly plated cobalt to substrates it can be desirable to perform etching prior to plating and post plating annealing.

14. Claims 18, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein as applied to claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 above, and further in view of Inoue et al (US 2003/0075808).

Feldstein teaches all the features of these claims except the pH of the second solution, the annealing prior to forming the cobalt nucleation layer and the post-plating cleaning.

However, Inoue teaches that annealing may be necessary between the setps of performing chemical mechanical polishing of a wafer with copper interconnects and electrolessly cobalt plating the interconnects. Paragraph [0247]. Inoue also teaches cleaning the plated substrate after deposition. Paragraphs [0239] and [0247]. Inoue teaches that the pH of the electroless plating can be preferably 6-10. Paragraph [0250].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to anneal the substrate prior to forming the cobalt nucleation layer and cleaning after plating as suggested by Inoue with an expectation of desirable coating results because Feldstein teaches to apply conventional electroless layers to various substrates and Inoue teaches that when applying electrolessly plated cobalt to substrates it can be desirable to perform annealing prior to coating and cleaning after coating. It would further have been obvious to modify Feldstein in view of Inoue to optimize the pH of the second solution from the range given by Inoue. See In re Malagari, 182 USPQ 549.

15. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein as applied to claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 above, and further in view of Cohen et al (US 4737446).

Feldstein teaches all the features of this claim except the oxide removal.

However, Cohen teaches that it is desirable to remove oxides from a copper layer prior to performing electroless plating on it (column 17, lines 18-30) with metals such as cobalt (column 10, line 66 through column 11, line 2) to form printed circuits (column 1, lines 5-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to remove oxides from the exposed copper layer as suggested by Cohen with an expectation of desirable coating results because Feldstein teaches to apply conventional electroless layers to various substrates and Cohen teaches that oxides should be removed prior to electroless deposition.

16. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 1-2, 6, 8-14, 18-20, 24 and 27 above, and further in view of Cohen et al (US 4737446).

Inoue teaches all the features of this claim except the oxide removal.

However, Cohen teaches that it is desirable to remove oxides from a copper layer prior to performing electroless plating on it (column 17, lines 18-30) with metals such as

cobalt (column 10, line 66 through column 11, line 2) to form printed circuits (column 1, lines 5-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to remove oxides from the exposed copper layer as suggested by Cohen with an expectation of desirable coating results because Inoue teaches to apply conventional electroless layers to various substrates and Cohen teaches that oxides should be removed prior to electroless deposition.

17. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein as applied to claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 above, and further in view of Chung et al (US 2003/0057526).

Feldstein teaches all the features of this claim except that the nucleation layer is prevented from contact with air prior to forming the bulk cobalt layer.

However, Chung teaches that it is well known to perform coating on a nucleating seed layer under vacuum to prevent air or other impurities from being incorporated into the layers. Paragraph [0078].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to prevent contact of the nucleating layer with air prior to forming the bulk cobalt layer as suggested by Chung with an expectation of desirable coating results because Feldstein teaches to apply an electroless coating layer to a nucleation layer and Chung teaches that is desirable to perform coating on a

nucleating seed layer under vacuum to prevent air or other impurities from being incorporated into the layers.

18. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 1-2, 6, 8-14, 18-20, 24 and 27 above, and further in view of Chung et al (US 2003/0057526).

Inoue teaches all the features of this claim except that the nucleation layer is prevented from contact with air prior to forming the bulk cobalt layer.

However, Chung teaches that it is well known to perform coating on a nucleating seed layer under vacuum to prevent air or other impurities from being incorporated into the layers. Paragraph [0078].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to prevent contact of the nucleating layer with air prior to forming the bulk cobalt layer as suggested by Chung with an expectation of desirable coating results because Inoue teaches to apply an electroless coating layer to a nucleation layer and Chung teaches that is desirable to perform coating on a nucleating seed layer under vacuum to prevent air or other impurities from being incorporated into the layers.

19. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein as applied to claims 1-2, 5-6, 8-9, 12-14, 19 and 27-29 above, and further in view of Dubin et al (US 2002/0084529).

Feldstein teaches all the features of this claim except nitriding the bulk cobalt layer.

However, Dubin teaches that it is well known to nitride an electrolessly plated cobalt layer that acts as a capping material (shunt 280A). Paragraphs [0037], [0039]–[0040].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Feldstein to nitride the cobalt layer as suggested by Dubin with an expectation of desirable coating results because Feldstein teaches to apply an electroless coating layer of cobalt to a nucleation layer and Dubin teaches that is desirable to perform nitriding on a capping layer of cobalt that is electrolessly provided.

20. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 1-2, 6, 8-14, 18-20, 24 and 27 above, and further in view of Dubin et al (US 2002/0084529).

Inoue teaches all the features of this claim except nitriding the bulk cobalt layer.

However, Dubin teaches that it is well known to nitride an electrolessly plated cobalt layer that acts as a capping material (shunt 280A). Paragraphs [0037], [0039]–[0040].

24. The obvious double patenting rejections provided using US applications 10/609,518, 10/690,084 and US Patent 6962873 are withdrawn due to applicant's acceptable terminal disclaimers filed June 29, 2006 as discussed above.

Response to Arguments

25. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
PRIMARY EXAMINER

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inoue to nitride the cobalt layer as suggested by Dubin with an expectation of desirable coating results because Inoue teaches to apply an electroless coating layer of cobalt to a nucleation layer and Dubin teaches that is desirable to perform nitriding on a capping layer of cobalt that is electrolessly provided.

21. The previous 35 USC 103 rejections have been withdrawn in view of the new 35 USC 102 and 103 rejections provided above.

22. As to the use of Park (US 6962873) the Examiner notes the statement of common ownership provided at pages 8 of the June 29, 2006 amendment.

Terminal Disclaimer

23. The terminal disclaimers filed on June 29, 2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US applications 10/609,518, 10/690,084 and US Patent 6962873 have been reviewed and is accepted. The terminal disclaimer has been recorded.

Double Patenting

Notice of References Cited	Application/Control No. 10/742,006	Applicant(s)/Patent Under Reexamination MAYER ET AL.	
	Examiner Katherine A. Bareford	Art Unit 1762	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0084529	07-2002	Dubin et al.	257/774
*	B	US-4,181,760	01-1980	Feldstein, Nathan	427/99.1
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

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